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February 1993

A Method for Estimating Local Impacts of Cuts in Defense Spending

DC201R6

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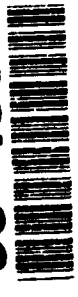

This paper was prepared as input to the Defense Conversion Commission in the preparation of its December 1992 report, *Adjusting to the Drawdown*. This paper does not necessarily reflect the findings, conclusions, or recommendations of the Defense Conversion Commission, the Department of Defense, or any other Federal department or agency, nor does the Commission necessarily endorse the views expressed herein.

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LMI

Executive Summary

In 1991, facing a declining Soviet threat, the Department of Defense (DoD) adopted a new national military strategy that shifted the focus from a global war scenario to worldwide regional war scenarios; that new strategy provides for:

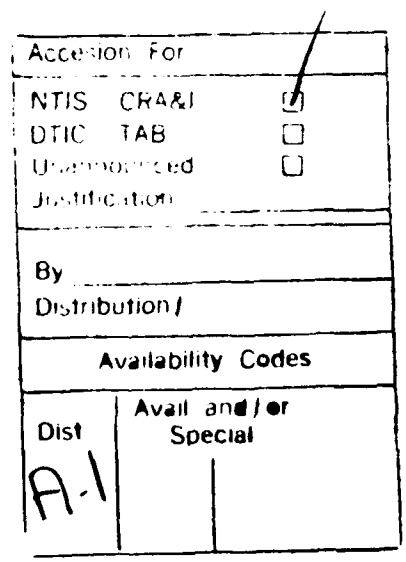
- effective strategic nuclear deterrence and strategic defense;
- credible forward presence of forces capable of participating in joint and combined operations;
- quick reinforcement of the forward military presence as crises emerge; and
- reconstitution of the military force structure, technology, and experienced personnel to meet the possible re-emergence of a global threat.

These strategic principles form the basis for a defense drawdown that will significantly reduce the number of military and civilian personnel in the Department of Defense and reduce defense procurements. The Defense Base Closure and Realignment Commission is also expected to recommend additional base closures.

By 1997, total DoD outlays are projected to decline by more than 30 percent in real terms from their 1987 levels. The DoD procurement outlays during the same period are expected to decrease by nearly 46 percent. It has been estimated that as many as 1 million private sector jobs in addition to approximately 800,000 DoD jobs may be affected by these planned reductions. The impact of DoD reductions and the accompanying indirect and induced employment reductions has caused serious concern in localities that could be adversely affected.

The Logistics Management Institute (LMI) has applied a methodology to estimate the job losses associated with defense reductions and has applied that methodology to U.S. metropolitan areas and nonmetropolitan counties. LMI's analysis shows that although the vast majority of communities with DoD-related activity

are not significantly dependent on that activity, 72 metropolitan and nonmetropolitan areas have been identified where there is a high dependency on defense spending. Further, the methodology could be refined and serve as the basis for a tiered monitoring strategy that could be applied to vulnerable localities.



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INTRODUCTION

Between 1987 and 1997, under current plans, the Department of Defense (DoD) drawdown is reducing the number of DoD personnel employed throughout the United States by approximately 200,000 civilian workers and 600,000 active military workers. Concurrently, reduced DoD contracting activity will curtail employment in the defense-related industries.

The impact of the drawdown at the aggregate national level is expected to be small relative to economic growth. Projected reductions in the number of active military installations, DoD personnel, and in the value of procurement contracts have the potential to cause substantial economic dislocation in some local areas.

LMI has developed a methodology for estimating the current economic significance of DoD activities to local economies in order to identify communities and metropolitan areas potentially vulnerable to anticipated drawdowns. Because the methodology discussed in this report estimates only vulnerability of areas and not the impact of potential reductions, it does not necessarily follow that areas identified as highly dependent on DoD will be adversely effected by drawdowns. Consolidation of certain DoD activities may, in some instances, actually increase the DoD role in a local economy.

The LMI methodology depends, in part, on the application of input-output models that, although essential for estimating aggregate economic impact, are subject to various limitations. Given the complexity of economic interactions and in some instances data constraints, such a methodology can only approximate the effects of DoD activities. Nonetheless, the approach described in this report

provides a useful means for identifying the potential severity of downsizing at the local level and could provide the basis for a tiered monitoring of vulnerable communities.

APPROACH AND CONSTRAINTS

To estimate the economic significance of DoD activity at the metropolitan area and nonmetropolitan county level, three components are examined:

- military, DoD civilian, and reserve payrolls;
- prime contracts (weapon system procurement accounts for a large share of these contracts); and
- local purchases by military installations.

DoD fund outlays create employment and accompanying wages and salaries. For developing a methodology, LMI categorized employment as being direct, indirect, or induced. *Direct* jobs are filled by DoD military and civilian personnel and prime contract employees. *Indirect* jobs are involved with the production of goods or the provision of services that are only direct *inputs* to the prime contract product (e.g., a subcontractor producing components for a weapon system). *Induced* jobs (e.g., retail and professional services) are those created locally as a result of local spending by direct and indirect workers.

The volume of local economic activity generated by DoD payrolls and/or purchases depends on several factors. In general, local areas with a sizable population and a diversified economic base generate greater numbers of jobs and earnings for the same goods, services, and payrolls when those areas are compared with less populated and less diversified areas. The number of additional jobs generated by each direct DoD job rises with the earnings of the employee. Thus, an enlisted service member paid at the E-3 salary grade level (about $17,000 per year including allowances) has considerably less impact on the local economy than does a DoD civilian paid at the GS-14 level (about $60,000 per year).

The methodology described in this report and its technical appendix estimates the total current (1991) DoD share of local economic activity for all metropolitan areas and nonmetropolitan counties in the United States, not the impact of the currently planned drawdown. This baseline can, however, be used to project the economic consequences of

potential changes in activities such as reductions in DoD procurement and personnel.

The process to determine the magnitude and economic role of DoD facilities and DoD procurement at the local level estimates the local indirect and induced effects of DoD payrolls, base purchases, and non-base-related procurement.[1] The share of local economic activity generated by DoD is tabulated for both earnings and jobs. The indirect and induced effects created by direct DoD payrolls and prime contracts are calculated by applying multipliers derived from the Department of Commerce Regional Input-Output Modeling System II (RIMS II) model for all major economic sectors for 21 metropolitan areas and non-metropolitan counties.[2] The 21 areas include large metropolitan, smaller metropolitan, and nonmetropolitan areas in all regions of the nation experiencing substantial DoD activity.[3] In some smaller areas, DoD activity is limited to the existence of military facilities and local purchases made by those facilities. In most larger areas, both DoD facilities and the private industries with DoD contracts are frequently present. Subcontract values are not added using the LMI process, except in cases where the subcontractor is located within the same geographical area as the prime contractor. In the later instance, the subcontractor is a supplier to the production process of the prime contractor; this indirect activity is implicitly captured in the multiplier.

To estimate the economic effects of DoD activities, prime contract data for the 21 areas was obtained for FY90 and FY91. It is recognized, however, that some contracts are for multi-year work. Therefore, a community that has limited contract activity in a given year may nonetheless have a substantial workforce funded from earlier contract awards. Averaging contract activity over a multiple-year period reduces, but does not fully eliminate this problem.

Generally, about one-half of the value of a typical (defense- and nondefense-)manufactured product is comprised of goods purchased from external subcontractors or vendors. However, the percentage of purchases from those subcontractors varies by the type of product manufactured. For example, a larger percentage of a product's total value is purchased from subcontractors supplying aircraft components

[1]To estimate the impacts at the state or multi-state levels, models different from those applied in this process should be used. Multipliers from the state and national levels are higher than local area multipliers.

[2]The multiplier is the number by which a change in investment must be multiplied to estimate the resulting change in income (or jobs).

[3]The selection process is discussed on pages A-2 and A-3 of Appendix A, *A Detailed Methodology*, to this report.

than for ship construction components. The probability that some subcontractors are located in the same metropolitan area as the prime contractor increases with the size and diversity of the area's industrial base. Nonetheless, subcontractors producing larger components (such as aircraft wings and engines) are frequently in states or regions different from that of the prime contractor.

The inability to capture most subcontracts in the LMI calculations causes underestimation of the aggregate effects of DoD purchases on local economies. On the basis of the LMI analysis of subcontractor data for several aircraft weapon systems and the state-level distribution of prime contracts in FY79 and FY80 (the only years for which these data were collected), LMI estimates that 35 percent to 40 percent of a contract's total value is subcontracted to firms located outside the metropolitan area where the prime contract is performed. Thus, LMI estimates that their approach captures 60 percent to 65 percent of all contract activity (both prime and subcontractor). LMI did not perform a detailed analysis of all subcontracts because subcontracts data are not readily available.[4]

The impact of DoD activity on jobs and earnings in all metropolitan areas of the nation is estimated by applying multipliers to direct DoD earnings, direct DoD jobs, installation purchases, and noninstallation prime contracts.[5] Those multipliers are shown in Table 1.[6] In the New England states, Metropolitan Statistical Area (MSA) boundaries differ from other states in that they do not follow county boundaries. Therefore, all New England counties that are partially or fully within designated metropolitan areas are considered metropolitan counties and included as part of the metropolitan area group.[7] A total of 35 such metropolitan counties in the six states are included in this group. In

[4]For a discussion of the DCC position on subcontract data, see *Adjusting to the Drawdown* Report of the Defense Conversion Commission, December 1992, p. 21.

[5]Installation purchases are defined as contracts for goods and services procured by an installation. They are typically operation and maintenance funded items. Noninstallation prime contracts are typically large procurements for goods (such as weapon systems) that are funded through the procurement appropriation.

[6]For a detailed discussion of how the coefficients shown in Table 1 were derived and other aspects of the methodology, see Appendix A.

[7]DoD payroll, DoD contract, and other data necessary to estimate impact have been collected at the county level. For consistency, metropolitan counties are areas partially or fully within New England MSAs or Primary Metropolitan Statistical Areas (PMSAs) for which impact is measured because MSA boundaries do not follow county boundaries.

addition to metropolitan areas, LMI estimates the direct, indirect, and induced effects in nonmetropolitan counties.

TABLE 1

Multipliers, Employment, and Earnings Coefficient Values Grouped by MSA/County Population

MSA/county population group	Earnings per $1 million				Jobs per $1 million[d]			
	Prime contracts[a]		DoD payrolls[b]		Prime contracts		DoD payrolls	
	Procure-ment	Installa-tion purchases	Civilian	Military[c]	Procure-ment	Base purchases	Civilian	Military[c]
Group 1: large MSA or metropolitan county >650,000 people	$0.682M	$0.500M	$1.347M	$1.267M	25.5	24.8	17.7	13.6
Group 2: large MSA or metropolitan county 60,000–649,999 people	0.542	0.500	1.259	1.200	23.0	24.8	13.9	10.7
Group 3: non-MSA county	0.416	0.439	1.158	1.134	19.9	23.4	10.8	8.3

Note: MSAs in this report include both Primary Metropolitan Statistical Areas (PMSAs) and MSAs except those in the New England states.

[a] Includes direct, indirect, and induced earnings.

[b] Includes direct DoD payrolls.

[c] For Army and Air Force installations. Navy installation multiplier values are somewhat lower. (See Appendix A for derivation.)

[d] Includes direct, indirect, and induced jobs.

ANALYSIS RESULTS

As shown in Table 2, employment in about 9 percent of all metropolitan areas and the New England metropolitan counties is very dependent on DoD-related activities. In those areas, DoD-related jobs exceed 20 percent of total employment. With one exception (Lima, OH), those areas are sites of major military installations. In another 32 MSAs, the DoD presence represents 10.0 percent to 19.9 percent of all area jobs. DoD activity exceeds 3 percent of total area jobs in about 40 percent of all MSAs in the United States.

The economic significance of DoD activity in about 150 metropolitan areas and New England urban counties is relatively minor (less than 1.5 percent of all jobs and income). A note of caution should be added, however. Some "low-significance" MSAs may be recipients of substantial subcontracts from DoD prime contractors. The

inclusion of subcontractor payrolls and local purchases could elevate those areas into higher significance categories.

The methodology applied to estimate the DoD role in nonmetropolitan counties is similar to the metropolitan area approach. However, to avoid the necessity of computing estimates for the more than 3,100 counties in the nation, a sorting process was initiated to limit the analysis to nonmetropolitan areas that appear to have at least a modest, identifiable DoD presence. The sorting process consisted of first estimating the per capita value of (1) DoD payrolls and (2) DoD prime contracts for each county in the nation based on county data taken from the *Consolidated Federal Funds Report.*[8] Counties that had a combined per capita DoD payroll and prime contracts value exceeding $750 per capita were grouped into one set; counties below this threshold were grouped into a second set. The rationale for using $750 per capita as a selection criteria is that DoD activity above this level is likely to be equivalent to about 3 percent of total area earnings and jobs. This percentage is equivalent to approximately 2 years of job growth based on average growth rates during the 1980s.

TABLE 2

Metropolitan County DoD-Related Jobs and Earnings as a Percentage of all Jobs and Income

DoD-related percentage of jobs or earnings	Number of MSAs and New England metropolitan counties[a]		Percentage distribution	
	Jobs	Income	Jobs	Income
20.0 percent and over	31	22	9.1%	6.5%
10.0 through 19.9 percent	32	27	9.4	8.0
5.0 through 9.9 percent	45	42	13.3	12.4
3.0 through 4.9 percent	32	34	9.4	10.0
1.5 through 2.9 percent	53	56	15.6	16.5
Below 1.5 percent	146	158	43.1	46.6
Total	339	339	100.0%[b]	100.0%

[a] MSAs in this analysis include 304 MSAs and PMSAs outside the New England states. In addition, 35 metropolitan counties in New England are also included.

[b] Does not add to exactly 100 percent due to rounding.

[8]Bureau of the Census, *Consolidated Federal Funds Report Fiscal Year 1991*, March 1992.

Additional earnings and employment that result from DoD payrolls, DoD base purchases, and other DoD prime contracts were estimated for all counties with per capita values in excess of $750. The appropriate multipliers associated with these counties were based on nonmetropolitan county multipliers shown in Table 1.

As shown in Table 3, the vast majority of nonmetropolitan counties have only limited DoD activity. DoD-generated jobs exceed 3 percent of the county total in 137 nonmetropolitan counties. However, in 41 nonmetropolitan counties, DoD jobs are 20 percent or more of total county jobs.

TABLE 3

Nonmetropolitan County DoD-Related Jobs and Earnings as a Percentage of all County Jobs and Income

DoD-related percentage of jobs or earnings	Number of nonmetropolitan counties		Percentage distribution	
	Jobs	Income	Jobs	Income
20.0 percent and over	41	41	1.7%	1.7%
10.9 through 19.9 percent	39	39	1.6	1.6
5.0 through 9.9 percent	31	31	1.2	1.3
3.0 through 4.9 percent[a]	26	21	1.1	0.9
Below 3.0 percent[a]	2,285	2,290	94.3	94.5
Total	2,422	2,422	100.0%[b]	100.0%

[a] Inclusion of all DoD civilian employees in the analysis could increase the number of nonmetropolitan counties in the 3.0 percent to 4.9 percent category.

[b] Does not add to exactly 100 percent due to rounding.

CONCLUSIONS

The analysis shows that a DoD presence in an area is not the dominant economic force in most areas of the nation. In the majority of metropolitan areas and nonmetropolitan counties, the DoD outlays account for only a small percentage of total economic activity. In most of these areas, particularly where the non-defense related economy is diversified, drawdown impacts could be offset by growth in non-defense-related private economic activities or additional public sector outlays.

The net economic impact of reduced DoD activity in other, more vulnerable areas is difficult, and perhaps impossible, to fully project.

Other Federal expenditures at the local level such as infrastructure outlays, retraining, and other activities aimed at expanding economic growth can have positive economic impacts. Additionally, private sector responses to market forces could add greatly to a local economy. The net effects of these other Federal outlays and non-governmental activities will vary from community to community and could overwhelm any expected DoD impact.

In areas where the DoD presence dominates the local economy, sharply reduced DoD activities may not be fully offset by growth in other economic activities. The LMI analysis identified about 70 metropolitan and nonmetropolitan areas very dependent on DoD. Those are principally locations with large military bases within smaller metropolitan or nonmetropolitan areas and those with substantial DoD shipbuilding activities. In those areas, substantial reductions in defense-related activities could cause significant dislocation even if the national economy grows rapidly. Therefore, economic adjustment policies and programs should focus on the few U.S. localities where the impact of DoD drawdowns are expected to be the most severe.

The LMI model estimates total direct, indirect, and induced employment from DoD-related activities to be approximately 6.9 million workers in FY91. This total, however, understates total national employment effects in part because the economic impacts of subcontracts on the areas are not fully captured by the methodology used for calculating jobs. Additional analyses will be required to further refine individual local area and aggregate economic impacts.

Appendix A
Detailed Methodology

DATA SOURCES

This report depended on several specified data sources. However, because these data sources are particularly crucial to the analysis, the data from these sources are described in this section.

Consolidated Federal Funds Report – Fiscal Year 1991

This publication, released annually by the Bureau of the Census for the Office of Management and Budget (OMB), incorporates data at the state, county, and sub-county level on Federal Government expenditures and obligations grouped by category. Among these categories, two were utilized in this analysis: *Department of Defense Salaries and Wages*, and *Department of Defense Procurement Contract Awards.*

Salary and wage data are provided by DoD to the Bureau of the Census in the form of a computer tape file containing data records that are distributed using Federal Information Processing Standard (FIPS) geographic records. Each county in the United States is identified by a five-digit number which includes a state and county code. Totals include salaries, wages, housing allowances, and all other personnel compensation other than retirement pay.

Procurement data in the report excludes $9.2 billion for procurement in foreign countries. In addition, contract data provided by the Federal Procurement Data Center (FPDC) by location excludes contract awards under $25,000.

Atlas/Data Abstract for the United States and Selected Areas – Fiscal Year 1991

This report provides state totals for military and civilian personnel, payroll outlays, and prime contracts over $25,000 for all service branches and other Department of Defense activities at the state level. Payroll outlays, prime contracts, active military personnel, and civilian personnel are also available by location or facility within each state for the ten locations where expenditures and personnel levels are the highest.

Active military personnel counts exclude personnel who are temporarily shore-based, in a transient status, or afloat. A total of about 330,000 military personnel were excluded based on these categories. Only direct-hire civilian personnel subject to OMB ceiling controls are included in this data source.

Prime contract data in this report are similar (but not identical) to the contract data shown in the *Consolidated Federal Funds Report.* As in the later source, only contract obligations over $25,000 are included. In general (but with some important exceptions), contracts are specified for the location where the work is being performed.

Bureau of the Census

Several data items are extracted from the 1990 Census of Population. These include the number of active military personnel, population, and civilian employment at the MSA and county levels.

SELECTION OF REPRESENTATIVE AREAS

The selection of the 21 representative areas for which RIMS II model runs were made was based on several criteria. The first was to limit areas to a workable number. Although a sample size of 50 or so would have been preferable from a statistical perspective, the level of effort required to link model outputs with prime contract data limited the sample to a smaller number.

Specific areas were selected taking into account such factors as population, type of DoD activity and geographic location. Of the 21 selected areas, 9 are large metropolitan areas, 8 are smaller metropolitan areas and the balance are non-metropolitan areas. Weapons system production facilities or a combination of weapon

systems production facilities and military installations are present in most of these areas. In six locations, DoD activities dominate the local economy. Both shipbuilding and aerospace industries are represented in the selected metropolitan areas. Finally, geographic diversity was considered, with each of the nation's regions represented in the sample.

JOB AND EARNINGS MULTIPLIERS

This methodology and analysis focuses on two effects of DoD activities at the local level: jobs and earnings. To estimate the aggregate impact of DoD activities, job and earnings multipliers are applied to direct impacts. These multipliers, derived from the Department of Commerce Bureau of Economic Analysis (BEA) Regional Input-Output Modeling System II (RIMS II) models, are shown in Table A-1.[1] The industrial composition of each selected area consists of 39 row industries and 528 column industries as defined by BEA. Column industries include several directly linked to DoD procurement, such as guided missiles and space vehicles, ammunition, tanks, small arms, aircraft, aircraft and missile engines, and shipbuilding.

Multipliers for each of the 21 (i.e., metropolitan or nonmetropolitan) areas are grouped into three areas based on population size and status. In general, multiplier values rise with population up to a level of about one million residents. Beyond one million residents, however, multipliers tend to be stable.

Although there is a strong, statistically significant correlation between population size and multiplier values, only part of the variance among areas can be explained by population size. Other variables include the industrial composition of the area and the type of DoD activity. For example, purchases made by an installation typically create more local jobs per $1 million of outlay than does the purchase of $1 million in aircraft parts. In part, this is due to wage differentials and the labor intensity of the product or service purchased.

MILITARY AND CIVILIAN PERSONNEL

Several estimates of the total number of active military personnel in the United States during FY90 and FY91 are shown in Table A-2.

[1]The RIMS II model used for this analysis is based on 1989 earnings and jobs. Therefore, these data have been adjusted in the analysis to incorporate 1990 earnings and job estimates.

TABLE A-1

Grouping of Selected Areas by MSA/County Size

Area[a] (MSA/county)	Population (000)	Prime contracts multiplier		DoD civilian payroll		DoD military payroll	
		Earnings[b] ($ millions)	Jobs per $1 million[c]	Earnings[d] ($ millions)	Jobs per $1 million[c]	Earnings[d] ($ millions)	Jobs per $1 million[c]
Group 1 – Large Metropolitan Areas							
Baltimore, MD	2,382	$0.763M	27.5	$1.379M	18.3	$1.292M	14.1
Dallas, TX	2,553	0.623	20.9	1.346	18.0	1.266	13.9
Indianapolis, IN	1,250	0.620	29.4	1.357	21.3	1.275	16.4
Los Angeles, CA	8,863	0.605	19.7	1.330	14.6	1.254	11.2
Orlando, FL	1,073	0.637	27.5	1.330	17.9	1.254	13.8
Philadelphia, PA	4,857	0.881	30.8	1.367	18.0	1.278	13.5
Seattle, WA	1,973	0.643	26.0	1.338	18.6	1.254	11.2
San Diego, CA	2,498	0.683	22.4	1.326	14.9	1.241	11.0
Average	3,181	$0.682M	25.5	$1.347M	17.7	$1.264M	13.1
Group 2 – Small Metropolitan Areas							
Aroostook, ME	211	$0.445M	26.8	$1.240M	14.8	$1.185M	11.4
Worcester, MA	437	0.663	24.4	1.324	16.7	1.249	12.9
New London, CT	267	0.579	20.4	1.236	11.2	1.182	8.6
Bridgeport, CT	188	0.666	21.2	1.327	14.2	1.252	10.9
Portsmouth, NH[e]	224	—	—	1.321	17.2	1.247	13.2
Jackson City, MS	150	0.493	20.4	.159	10.4	1.122	8.0
Merced, CA	180	0.486	18.5	1.236	11.4	1.182	8.8
Horry, SC	138	0.463	29.1	1.232	15.3	1.179	11.8
Average	224	$0.542M	23.0	$1.259M	13.9	$1.200M	10.7
Group 3 – Nonmetropolitan Counties							
Sagadahoc, ME	33	$0.381M	14.4	$1.080M	5.7	$1.062M	4.4
Miami, IN	37	0.437	18.7	1.174	12.8	1.134	9.9
Iosco, MI	30	0.448	24.1	1.183	11.3	1.141	8.7
Mississippi, AR	58	0.397	22.5	1.192	13.4	1.198	10.3
Average	40	$0.416M	19.9	$1.158M	10.8	$1.134M	8.3

Note: For example, a $1 million contract in Dallas increases area earnings by $623,000.

[a] San Jose has been excluded from this table because multiplier values for this MSA, as a result of its unique economic base, deviate substantially from other large metropolitan areas.

[b] Additional earnings for every $1 million in prime contracts.

[c] As of 1989. Downward adjustment for productivity and inflation incorporated into the model.

[d] Earnings (including direct, indirect, and induced) for every $1 million in DoD payrolls. For example, $1 million in DoD civilian earnings in the Baltimore, MD, MSA increases total area earnings to $1,379,000.

[e] Includes parts of York, Stratford, and Rockingham counties.

Some of the difference in values shown is explained by the various dates at which the estimates were made. Between FY90 and FY91, the total number of active military personnel declined by 58,000. However, because some of the reductions occurred in military units stationed in foreign countries, the net personnel change within the United States was considerably smaller.

TABLE A-2

Number of Active Military Personnel in the United States

Source	Year	Number of personnel
DIOR Atlas/Data Abstract	FY91	1,593,407
U.S. Bureau of Labor Statistics	FY90	1,637,000
Bureau of the Census, *1990 Census of Population*	FY90	1,708,928

For purposes of this analysis, the availability of data about the location of active military personnel at the county level was the key factor in selecting the available data source. Currently, no single data source exists that aggregates, for all Military Services, DoD personnel by place of residence at the county and metropolitan levels. Therefore, the following three data sources were used to estimate the total number of active military personnel at the county level in the United States during FY90 and FY91.

DIOR Atlas/Data Abstract for the United States and selected areas. This 1991 report lists the number of active duty military personnel and civilians by state and location for the 10 largest DoD installations within each state. However, the county or MSA location of the installations is not identified. In states with more than 10 DoD installations (e.g., California, Texas, and Virginia), numerous DoD installations are excluded from this report.

FORMIS-91 and 97 Reports (also known as *DoD Manpower Authority, 1991 and 1997).* This source provides data, presented by installation, for military and DoD civilian personnel for each of the Military Services. Again, the political subdivision (e.g., the county) or place of residence are not always identified, and all military personnel are not shown as being assigned to any particular military installations.

1990 Census of Population. The 1990 Census asked each respondent to state whether he or she is on active military duty. However, DoD civilian employees are not identified by their locations in the Census. The Census data are available only for all political subdivisions, presented by place of residence.

Personnel data obtained from DoD, unlike Census data, are presented by place of employment (i.e., the location of the DoD installation). To estimate the economic impacts of DoD personnel, their place of residence is preferable because households tend to purchase goods and services close to where they reside. Because the 1990 Census provides the most comprehensive source of data about the location of active duty military personnel, this data source was used to estimate the number of active duty personnel at the MSA and county levels. However, *changes* in the location of active duty military personnel between 1990 and 1991 are not incorporated into these data. Thus, the total number of personnel indicated by this data source may be somewhat overstated. For example, the number of military personnel at Pease AFB, NH, declined substantially between 1990 and 1991 because the base was closing.

For civilian DoD personnel, both the *DIOR Atlas/Data Abstract* and *FORMIS-91* report data are used for the 21 selected areas and for the analysis of all metropolitan and nonmetropolitan county areas.[2] The *DIOR Atlas* estimates that the number of civilian DoD employees was 911,175 in FY91.[3] However, only about 76 percent of all direct DoD civilian personnel could be allocated as direct employees at the metropolitan and nonmetropolitan county level. The majority of the civilian personnel not counted are located at smaller DoD installations or facilities. However, it should be noted that the induced and indirect effects on all civilian DoD employees have been *fully* captured by the model for each area because all aggregate earnings data (described subsequently), have been incorporated into the analysis.

Table A-3 shows the number of active military personnel and estimated earnings measured by place of residence, and the number of civilian DoD personnel and earnings measured by place of work for each of the 21 areas.

[2]Because the *DIOR Atlas* is, in most instances, more comprehensive than the *FORMIS-91*, the *DIOR Atlas* was used except in areas where it provided no data.

[3]This number includes only direct-hire personnel subject to Office of Management and Budget (OMB) ceiling controls.

TABLE A-3
DoD Employment and Earnings

MSA/county	Direct military employment[a]	Direct civilian DoD employment[b]	Estimated military earnings ($ millions)[c]	Estimated civilian and reserve earnings ($ millions)[d]	Percentage of military share of total DoD payroll
Aroostook, ME	5,177	512	$118.5	$0.0[e]	100.0%
Baltimore, MD	23,118	14,378	529.2	518.9	50.5
Dallas, TX	3,069	2,132	70.3	88.9	44.2
Bridgeport, CT	376	406	8.6	14.9	36.6
Horry, SC	4,694	397	107.5	0.0[e]	100.0
Pascagoula, MS	133	541	3.0	29.4	9.4
Indianapolis, IN	3,317	8,464	75.9	392.9	16.2
Los Angeles, CA	19,026	6,691	435.5	448.5	49.3
Iosco, MI	2,403	362	55.0	27.2	66.9
Merced, CA	4,271	395	97.8	47.7	67.2
Miami, IN	2,071	815	47.4	40.4	54.0
Mississippi, AR	2,535	300	58.0	14.5	80.0
New London, CT	13,133	1,466	300.6	93.6	76.3
Orlando, FL	13,285	2,557	304.1	117.4	72.2
Philadelphia, PA	22,055	23,568	504.9	991.5	33.7
Portsmouth, NH	2,856	7,763	65.4	252.8	20.5
San Diego, CA	111,011	22,296	2,541.2	903.2	73.8
San Jose, CA	5,428	1,102	124.3	108.7	53.3
Sagadahoc, ME	1,172	727	26.8	1.6	94.5
Seattle, WA	3,701	2,792	84.7	59.9	58.6
Worcester, MA	5,157	1,749	118.0	0.0[e]	100.0%

[a] From *1990 Census of Population.*

[b] From *DIOR Atlas/Data Abstract and FORMIS 91.*

[c] Derived from military employment statistics.

[d] Derived from total earnings less estimated military earnings statistics.

[e] Military earnings by place of residence are equal to, or exceed, total DoD payroll by place of work.

ALLOCATION OF MILITARY AND CIVILIAN PAYROLLS

Data about combined military and DoD civilian payrolls at the county level are shown in the *Consolidated Federal Funds Report Fiscal*

Year 1991.[4] Aggregate and state-level military and DoD civilian earnings are also shown in the *DIOR Atlas/Data Abstract.* However, the source does not provide payroll data at the county level. Total DoD compensation allocated to states during FY91 was $74,380 million (see Table A-4). Total DoD payrolls (including Reserve and National Guard) shown in the *Consolidated Federal Funds Report* are $75,255 million. The total difference in payroll reflected by the two reports is probably attributable to the payroll funds included in the state totals that was never distributed to the states.

TABLE A-4
DoD Payrolls Distributed by State
($ millions)

Personnel	Amount
Civilian	$29,901
Military Active Duty	39,118
Reserve and National Guard	5,361
Total	$74,380

Source: OSD Operations and Reports, DIOR Atlas/Data Abstract for the United States, DIOR/203-91.

Usually, DoD payrolls are distributed to the area (e.g., a city or county) where the person receiving compensation is employed. However, in some instances, DIOR prorated outlays from a central paying office to areas. In other instances, where it was not possible to prorate, outlays are reported directly at the finance offices issuing the checks. Although the aggregate totals shown in the *Consolidated Federal Funds Report* and the *DIOR Atlas/Data Abstract* are virtually the same, the *Consolidated Report* is more comprehensive because the agency preparing that report allocates payrolls using a computer file and Federal Information Processing Standard (FIPS) geographic codes. Therefore, the *Consolidated Report* is used to allocate DoD payrolls. Both reports aggregate total DoD earnings. However, because different multipliers are applied to active military and other DoD earnings, the totals needed to be grouped into separate military and civilian components.

[4]Bureau of the Census, *Consolidated Federal Funds Report Fiscal Year 1991*, March 1992.

Military payrolls in each area were estimated by multiplying the number of military personnel residing in an area (i.e., obtained from the *1990 Census of Population*) by average military wages and other direct compensation. The average compensation payments in FY91 are estimated to be $22,800 per active military person. Nonmilitary payrolls were computed by subtracting the active military payroll component from total DoD payroll. The residual is the civilian DoD and Reserve/National Guard payroll. The civilian direct payroll average in FY91 was about $30,000 per person, and the Reserve/National Guard payroll average was about $6,000 per person. The allocation of payrolls for the 21 selected areas is shown in Table A-5.

The payroll allocation process has certain limitations. Military employment, as shown in the *1990 Census of Population* (and used in this report) is presented by place of residence, while payroll data are presented by place of work (typically a military or other DoD facility). This can be a problem when a military facility is near the boundary of another county or MSA. In those instances, the number of military personnel residing in a county can differ substantially from the number employed at the installation. Therefore, in several instances, the earnings of military personnel in a given county can equal or exceed total reported DoD earnings. This problem can typically arise in non-metropolitan or one-county metropolitan areas. From an economic perspective, data about DoD personnel earnings by place of residence is preferable to employment location, but no military payroll data exist by place of residence.

Although payroll data at the aggregate (i.e., state and national) level are consistent with actual payroll disbursements – at the county level, the allocation is not always accurate. Distortions can occur because military payroll estimates are the product of individual reports from each of the four Military Services, and those data are not initially reported at the county level.

MULTIPLE COUNTY FORMATION

In several instances, a large military installation is near the boundary of a second county or is located in two counties simultaneously. Also, a large percentage of workers at the facility might commute from other areas. For example, Army headquarters at Fort Stewart are located in Bryan County, GA. Although only a few hundred military families live in Bryan County, the total facility payroll is allocated by the Office of the Secretary of Defense (OSD) to the county. In fact, all on-base and most off-base housing is located in Liberty County. Therefore, the two counties are merged for *purposes of*

TABLE A-5

Earnings and Employment Impacts of DoD Military and Civilian Payrolls

MSA/county	DoD employee payroll[a] ($ millions)	Induced earnings[b] ($ millions)		Induced jobs	
		Military	Civilian	Military	Civilian
Aroostook, ME	$85.0	$21.9	$0.0	1,440	0
Baltimore, MD	1,048.1	154.4	196.7	8,960	9,021
Dallas, TX	159.1	18.5	30.7	1,173	1,519
Bridgeport, CT	23.5	2.2	4.9	113	201
Horry, SC	94.7	19.2	0.0	1,526	0
Pascagoula, MS	32.5	0.4	4.7	26	291
Indianapolis, IN	468.9	20.9	140.3	1,495	7,951
Los Angeles, CA	884.0	110.6	148.0	5,879	6,221
Iosco, MI	82.2	7.8	5.0	519	292
Merced, CA	145.5	17.8	11.3	978	517
Miami, IN	87.8	6.4	7.0	503	492
Mississippi, AR	72.5	8.6	2.8	638	184
New London, CT	394.2	54.6	22.1	2,911	996
Orlando, FL	421.5	77.2	38.7	5,033	1,996
Philadelphia, PA	1,496.3	140.4	363.9	8,402	16,954
Portsmouth, NH	318.2	16.2	81.1	1,026	4,131
San Diego, CA	3,444.4	612.4	294.4	34,372	12,785
San Jose, CA	232.9	24.9	28.1	1,597	1,435
Sagadahoc, ME	28.4	1.7	0.1	119	8
Seattle, WA	144.6	21.5	20.2	1,139	1,058
Worcester, MA	15.0	29.5	0.0	1,833	0

Source: Bureau of the Census, *Consolidated Federal Funds Report Fiscal Year 1991*, March 1992.

[a] Includes the active reserve and National Guard.

[b] This is in addition to DoD payroll. Thus, for example, total earnings gains resulting from the DoD presence in Los Angeles is $1,142.6 million. Those earnings generate 12,100 non-DoD jobs.

this report into a "Liberty County Consolidated Area." In three other areas, similar conditions were found – two DoD-impacted areas were merged into one. Those three areas are: the King George County, VA Consolidated Area; the Geary County, KS Consolidated Area; and the Martin County, IN Consolidated Area. Although the economic impact of large military installations spills over county boundaries into other areas as well, the four "combined" areas discussed above are those where the job spill-over impact is the most significant. Except for those

four areas, impacts are estimated for each individual nonmetropolitan county.

Estimating the Impact of DoD Payrolls on Area Earnings and Employment

To estimate the indirect and induced economic impact of DoD payrolls in each area, household multipliers for earnings (derived from the area RIMS II model outputs) were applied to DoD payrolls. Those multipliers were adjusted as follows:

- Military personnel (Army and Air Force) equals 77 percent of the RIMS II coefficient value.
- Military personnel (Navy) equals 73 percent of the RIMS II coefficient value.
- Civilian DoD personnel equals 100 percent of the RIMS II coefficient value (no adjustment was necessary).

To account for post exchange (PX) and commissary purchases at DoD installations, and services received by the military members and their families on base[5], downward adjustments for military personnel were made to the following sectors:

- retail trade,
- wholesale trade,
- personal services,
- health services,
- miscellaneous services, and
- utilities.

Retail trade and health services account for most of the adjustment. Because Navy personnel aboard ships purchase some goods and

[5]Personnel providing those on-base services are already counted as direct DoD base workers.

services away from their home port, the Navy multiplier should be further adjusted downward to be analytically comparable with the other Military Services.

Applying the adjusted household multiplier to DoD payrolls provides an estimate of additional earnings within the area generated by those payrolls. (See Table A-1 for the multiplier coefficients for the 21 areas.) Note that DoD civilian worker earnings require no adjustment because civilians do not consume goods and services on base. The same approach is applied to calculate additional employment. These jobs are expressed in terms of the increase in induced employment realized for each $1 million in DoD earnings (wages and salaries). The results of this analysis are shown in Table A-5.

PURCHASES MADE BY INSTALLATIONS

Purchases made by installations in the local area (i.e., at the county and MSA levels) were computed by examining prime contract base purchases by obtaining individual contract data from Defense Department (DD) Form 350 *Individual Contracting Action Reports* for selected areas and from the *Consolidated Federal Funds Report*. The determination of the contracts that were related to a particular facility was based on their standard industrial classification (SIC) code. For example, contracts for repairs, construction, and utilities were considered purchases by installations. Note that DD Form 350 data understates actual purchases because very small contracts are not allocated by geographical area. It is assumed that all installation purchases occur through prime contracts as their purchase mechanism.

To establish the typical installation purchase pattern, the distribution of prime contracts in six nonmetropolitan counties and small MSAs with military bases (but no large procurement contractors) was tabulated from DD Form 350; the percentage of purchases by SIC code was calculated for purchases by bases. The total value of installation purchases was then compared with total DoD payrolls obtained from the *Consolidated Federal Funds Report* to obtain a ratio. LMI found that local prime contracts average about 13 percent of total DoD payrolls.[6] Although total purchases by installations are substantially higher, contracts for most goods and services, particularly

[6]In a few isolated geographical areas, the purchase level falls below 13 percent of DoD payrolls.

those made outside large urban areas, are issued to sellers/vendors outside the county or MSA boundaries.

For each category of purchases (such as maintenance of base facilities and utilities), the appropriate multiplier was derived from the BEA RIMS II model. Multipliers for both jobs and earnings were applied. The resulting jobs and earnings figures are estimates of the indirect and induced impact of base purchases at the local level. The percentage value of total DoD earnings that local base purchases represent along with the distribution of purchases from selected areas (presented by category) is applied to other areas with military facilities. The premise is that the distribution in certain selected areas is generally stable across such facilities. The appropriate multipliers for installation purchases are shown in Table A-6.

TABLE A-6
Installation Purchase Multipliers

Group	Earnings multiplier	Total jobs per $1 million in base purchases
Group 1 – large MSA[a]	0.500	24.8[a]
Group 2 – small MSA	0.500	24.8
Group 3 – non-MSA county	0.439	23.4

[a] Multipliers are not calculated separately for this group. Group 2 values are applied.

An examination of local purchase data obtained from installation surveys conducted at several large Army and Marine Corps installations in metropolitan areas shows that base purchases as a percentage of payroll are quite similar to the six areas used for establishing an average rate.[7] Estimated DoD base purchases, added jobs, and the earnings resulting from these purchases are shown in Table A-7.

[7]These installation's purchase data were collected for a study entitled: *The Economic Impacts of Desert Shield/Desert Storm Deployments on Local Communities*, FP101R8, February 1992, completed by LMI for DoD's Office of Economic Adjustment.

TABLE A- 7

Earnings and Employment Impact of Purchases Made by Military Facilities

MSA/county	Local facility purchases ($ millions)	Added direct, indirect, and induced earnings ($ millions)	Added direct, indirect, and induced jobs
Aroostook, ME	$11.0	$4.7	260
Baltimore, MD	136.3	68.1	3,210
Dallas, TX	20.7	10.3	487
Bridgeport, CT	3.1	1.5	72
Horry, SC	12.3	5.3	274
Pascagoula, MS	4.2	2.1	99
Indianapolis, IN	61.0	30.5	1,436
Los Angeles, CA	114.9	57.5	2,708
Iosco, MI	10.7	3.7	237
Merced, CA	18.9	9.5	446
Miami, IN	11.4	0.0	254
Mississippi, AR	9.4	4.1	222
New London, CT	51.2	25.6	1,207
Orlando, FL	54.8	27.4	1,291
Philadelphia, PA	194.5	97.3	4,583
Portsmouth, NH	41.4	20.7	975
San Diego, CA	447.8	223.9	10,549
San Jose, CA	30.3	15.1	713
Sagadahoc, ME	3.7	1.6	82
Seattle, WA	18.8	9.4	443
Worcester, MA	2.0	1.0	46

NON-FACILITY-RELATED PRIME DoD CONTRACTS

In urban areas where prime contractors produce weapon systems, the value of contracts tends to be larger than direct DoD payrolls. However, the methodology used for estimating the secondary effects of those purchases is identical to the methodology used for estimating the impact of base purchases on earnings and employment. The SIC codes for DD Form 350 were converted to BEA codes, and the four-digit code

TABLE A-8

Earnings and Employment Impact of Prime DoD Contracts (Non-facility-related)

MSA/county	Prime contracts ($ millions)[a]			Total earnings generated (direct, indirect, and induced) ($ millions)[b]	Total jobs generated (direct, indirect, and induced)[b]
	FY90	FY91	FY90 – FY91 (average)		
Aroostook, ME	$6.2	$0.9	$3.5	$1.6	90
Baltimore, MD	2,098.9	1,676.3	1,887.6	840.0	49,314
Dallas, TX	2,088.6	2,676.5	2,382.6	1,060.2	47,306
Bridgeport, CT	1,758.8	1,512.5	1,635.7	727.9	32,943
Horry, SC	0.0	0.0	0.0	24.4	1,515
Pascagoula, MS	907.9	998.0	952.9	424.0	18,467
Indianapolis, IN	543.0	778.6	660.8	294.1	18,457
Los Angeles, CA	8,725.2	9,919.4	9,322.3	4,148.4	174,465
Iosco, MI	0.0	1.0	0.5	0.0	0
Merced, CA	5.6	7.4	6.5	2.9	114
Miami, IN	6.3	11.9	9.6	0.0	0
Mississippi, AR	3.1	0.0	1.5	0.6	31
New London, CT	1,234.1	2,202.4	1,718.2	764.6	33,299
Orlando, FL	1,186.6	1,094.1	1,140.4	507.0	29,766
Philadelphia, PA	2,037.0	2,292.7	2,164.8	958.9	63,050
Portsmouth, NH	95.9	109.9	102.9	54.8	2,207
San Diego, CA	2,035.2	1,806.5	1,920.9	850.3	40,663
San Jose, CA	3,184.6	3,504.2	3,344.4	1,488.3	73,076
Sagadahoc, ME	731.5	849.1	790.3	351.7	10,812
Seattle, WA	2,023.8	722.6	1,373.2	611.1	33,919
Worcester, MA	143.0	193.5	168.3	982.6	3,902

[a] Where no prime contracts are shown in the table, prime contracts were considered to be local purchases by military facilities (and included as such in Table A-7).

[b] These data exclude jobs and earnings resulting from DoD installation purchases. Those data are shown in Table A-5.

(decimals) multiplier was applied to both employment and earnings. In these locations, the average annual value of prime contracts for FY90 and FY91 was used to estimate job and earnings impacts, because substantial year-to-year fluctuation in contract award levels were observed in some areas. However, by considering only FY90 and FY91 contracts, the economic effects of earlier awards (such as those from FY89 awards) on local economies are not measured. In some instances,

prime contract awards for large weapon systems (such as submarines and aircraft carriers) are spent over several years. Therefore, alternative approaches, such as incorporating contract activity over a four year period and obtaining, where feasible, actual outlays should be evaluated. The earnings and employment impacts of prime contracts associated with weapon systems and other goods and services are shown in Table A-8. In estimating multipliers, only prime contracts in excess of $5 million were considered. The average multipliers derived from those contracts were applied to all prime contracts by place of contract performance (as reported in the DD Form 350 reports). For example, the values of larger DoD prime contracts in a particular area total $1 billion, but all identified prime contract values total $1.2 billion. In this instance, the weighted multipliers derived for the $1 billion are applied to the $1.2 billion total. Only prime contracts in excess of $5 million in large urban areas were considered to avoid having to compute coefficients for the thousands of small DoD contracts executed in areas such as Los Angeles County.

TOTAL DOD-GENERATED EMPLOYMENT

Total DoD-generated employment in each of the 21 selected areas is the sum of (1) direct military and civilian employment; (2) additional indirect and induced employment resulting from DoD payrolls; and (3) the direct, indirect, and induced employment impact of both local purchases by military installations and non-installation-related procurement. Total DoD-generated employment as a share of all employment by place of residence is calculated to estimate the relative importance of DoD-related activities on local job levels. The percentage of direct, indirect, and induced DoD-related jobs of all jobs is shown in Table A-9. The table shows that the percentage varies from a high of 76.1 percent of all jobs in Sagadahoc County, ME, to 3.6 percent of all jobs in Worcester, MA.

TOTAL DOD-GENERATED EARNINGS

Total local DoD-generated earnings are the sum of (1) DoD military and civilian payrolls, (2) additional earnings generated by DoD personnel outlays in the area, (3) purchases by local installations, and (4) DoD procurement contracts in the area. Total earnings are compared to income from all sources to estimate the percentage of DoD-related earnings of total area income. A high percentage indicates the significance of DoD as a major component of the local economy; a low percentage suggests that DoD-related earnings are less crucial to the area's well being. The impact of DoD-related earnings is shown in

TABLE A-9

Impact of DoD Activities on Total Area Jobs

MSA/county	Direct DoD employment[a]	DoD payroll-induced jobs	DoD installation purchase-related jobs	DoD prime contract-related jobs	Total DoD jobs (direct, indirect, and induced)	Total area employment[b]	DoD percentage of all area jobs
Aroostook, ME	5,689	1,521	260	90	7,560	34,343	19.1%
Baltimore, MD	37,496	18,178	3,210	49,314	108,199	1,192,182	8.9
Dallas, TX	5,201	2,692	487	47,306	55,686	1,336,984	4.2
Bridgeport, CT	782	313	72	32,943	34,110	430,443	7.9
Horry, SC	5,091	1,420	274	1,515	8,300	52,044	14.6
Pascagoula, MS	674	317	99	18,467	19,557	48,343	39.4
Indianapolis, IN	11,781	9,459	1,436	18,457	41,133	633,277	6.5
Los Angeles, CA	25,717	12,053	2,708	174,465	214,944	4,203,792	5.1
Iosco, MI	2,765	810	237	0	3,813	9,728	31.4
Merced, CA	4,666	1,481	446	114	6,707	66,116	9.5
Miami, IN	2,886	995	254	0	4,135	14,893	24.4
Mississippi, AR	2,835	837	222	31	3,925	20,907	16.7
New London, CT	14,599	3,906	1,207	33,299	53,011	120,161	39.8
Orlando, FL	15,842	6,987	1,291	29,766	53,888	554,785	9.5
Philadelphia, PA	45,623	25,450	4,583	63,050	138,706	2,307,557	6.0
Portsmouth, NH	10,619	5,157	975	2,207	18,957	205,091	9.2
San Diego, CA	133,307	47,157	10,549	40,663	231,677	1,145,266	18.4
San Jose, CA	6,530	2,951	713	73,076	83,271	806,917	10.3
Sagadahoc, ME	1,899	127	82	10,812	12,920	15,810	76.1
Seattle, WA	6,493	2,188	443	33,919	43,043	1,054,078	4.1
Worcester, MA	6,906	1,808	46	3,902	12,661	343,039	3.6

[a] Active military and civilian.

[b] From *1990 Census of Population*.

Table A-10. Comparing DoD-generated earnings to total money income underestimates the importance of DoD to the local economy because money income includes such inputs as interest, dividends, and social security payments.

Total "area income" shown in Table A-10 is derived by increasing 1989 per capita income as reported by the Census by 5 percent (in order to take into account per capita income growth between 1989 and 1990). The adjusted per capita value is multiplied by the area's 1990 population to calculate aggregate money income.

It should be noted that "money income" as defined by the Census includes not only earnings, but also includes interest, dividends, rents and transfer payments. As such using DoD earnings as a percentage of

TABLE A-10

Impact of DoD Activities on Total Area Earnings ($ millions)

MSA/county	Direct DoD payroll earnings ($ millions)	DoD payroll (induced earnings) ($ millions)	Installation purchase-related earnings ($ millions)	DoD prime contract earnings ($ millions)	Total DoD-generated earnings (direct, indirect, induced) ($ millions)	Area income[a] ($ millions)	DoD percentage of total area income
Aroostook, ME	$85.0	$21.9	$4.7	$1.6	$146.7	$957.4	15.3%
Baltimore, MD	1,048.1	351.1	68.1	1,440.3	2,907.6	41,670.2	7.0
Dallas, TX	159.1	49.3	10.3	1,484.3	1,703.1	44,288.2	3.8
Bridgeport, CT	23.5	7.0	1.5	1,089.4	1,121.5	22,821.2	4.9
Horry, SC	94.7	19.2	5.3	25.4	157.3	1,880.4	8.4
Pascagoula, MS	32.5	5.1	2.1	469.8	509.4	1,366.0	37.3
Indianapolis, IN	468.9	161.2	30.5	409.7	1,070.2	19,968.1	5.4
Los Angeles, CA	884.0	258.6	57.5	5,639.9	6,890.1	150,860.3	4.5
Iosco, MI	82.2	12.7	3.7	0.0	98.6	304.3	32.4
Merced, CA	145.5	29.1	9.5	3.2	187.2	1,994.3	9.4
Miami, IN	87.8	13.4	0.0	0.0	101.2	422.4	24.0
Mississippi, AR	72.5	11.4	4.1	0.6	88.5	526.9	16.8
New London, CT	394.2	76.7	25.6	994.8	1,491.4	4,488.2	33.2
Orlando, FL	421.5	116.0	27.4	725.8	1,290.6	16,841.1	7.7
Philadelphia, PA	1,496.3	504.2	97.3	1,898.4	3,991.2	83,884.2	4.8
Portsmouth, NH	318.2	97.3	20.7	54.8	490.0	6,528.8	7.5
San Diego, CA	3,444.4	906.9	223.9	1,305.1	5,880.2	42,705.8	13.8
San Jose, CA	232.9	53.0	15.1	1,812.7	2,113.8	32,236.6	6.6
Sagadahoc, ME	28.4	1.8	1.6	301.1	332.9	483.1	68.9
Seattle, WA	144.6	41.7	9.4	883.0	1,078.7	37,266.7	2.9
Worcester, MA	15.0	29.5	1.0	111.6	260.1	11,594.5	2.2

[a] Money income from the *1990 Census of Population* based on 1989 income and 1990 population adjusted by 5 percent to incorporate the national rise in per capita income between 1989 and 1990.

area income underestimates the actual impact by over 20 percent.[8] For this reason, in most metropolitan areas, the percentage of DoD's impact expressed in terms of jobs exceeds the percentage of DoD's impact expressed in terms of income.

SCOPE OF ANALYSIS

The metropolitan areas and selected nonmetropolitan counties assessed in this analysis comprise the vast majority of total

[8]With the availability of new data, it will be feasible to estimate earnings at the county and MSA level for calendar year 1990 and 1991. The use of earnings, however, would have little effect on the *relative* impact of DoD among metropolitan areas and counties.

DoD-related activity (identified by location across the nation), as shown in Table A-11.

TABLE A-11
Allocation of DoD-Related Activity

Category	Allocated by MSA/county in analysis	U.S. total	Allocated by MSA/county as a percentage of U.S. total
Population (000)	198,802	248,710	79.9%
Number of active military	1,645,135	1,708,925	96.3
Number of civilian DoD[a]	688,951	911,175[c]	75.6
DoD payroll ($ millions)	$73,291[b]	$75,255	97.4
Prime Contracts[b] ($ millions)	$119,161	$139,571	85.4

Source: Bureau of the Census, *Consolidated Federal Funds Report Fiscal Year 1991* (March 1992) and the *DIOR Atlas.*

[a] Most DoD civilians are employed in areas included in the analysis. Data currently available limited ability to distribute all civilian personnel to MSAs and nonmetropolitan counties.

[b] Only considers contracts valued at over $25,000. Most smaller contracts are not allocated by DoD below the national level. The U.S. total includes all contracts other than classified programs.

[c] Excludes Non-appropriated Fund (NAF) employees and others not subject to OMB limitations.

Table A-11 shows that although 20 percent of the nation's population reside in nonmetropolitan counties not included in the analysis, those county areas account for only 2.6 percent of total DoD payroll and 3.7 percent of the number of active military personnel – presented by place of residence.

AGGREGATE IMPACT OF DoD AT THE LOCAL LEVEL

As shown in Table A-12, our analysis allocated about 6.2 million direct, indirect, and induced jobs at the metropolitan and nonmetropolitan county level.[9] That total, however, excludes several categories of workers. About 219,000 direct civilian DoD workers have

[9]The indirect and induced job totals are based on statistics derived from a sample of 21 areas. Because the sample size is limited, total DoD job estimates in this report may vary from estimates that would be derived from a larger sample.

not been distributed at the local level. Also excluded from the total civilian DoD count are NAF and temporary workers. In addition, $20.4 billion in prime contracts (mostly contracts under $25,000) cannot be allocated at the local level. Those contracts probably account for an additional 474,000 direct, indirect, and induced jobs at the local level.[10] Adding direct DoD civilian workers not distributed locally (but not induced employment these workers create) and private sector workers not distributed locally to the 6.2 million total allocated locally indicates that DoD-related activities employ about 6.9 million workers. The 6.9 million total DoD employment estimate is not comparable to the 960,000 private sector jobs that could be lost as a result of the drawdown.[11] The 6.9 million total refers to all current DoD-related direct, indirect, and induced jobs identifed at the local level, not potential losses attributable to the drawdown. The 960,000 estimate includes only potential direct and indirect private sector job losses resulting from decreases in DoD procurement activities between 1991 and 1997.

Because multipliers applied in the LMI model only incorporate the local effects of defense spending the 6.9 million estimate is conservative. In addition, subcontract activity is only partially captured by the process. Programs for the DoD undertaken by other Federal agencies, such as the Department of Energy, the National Aeronautics and Space Administration (NASA), and classified programs are excluded. Finally, Federal civilian DoD employees not subject to OMB ceilings, such as NAF employees, indirect hires, and direct hires not subject to OMB ceiling controls (a total of about 300,000 workers), are also excluded. When all programs, personnel, and agencies are included, the actual employment associated with all DoD-related activity probably exceeds 8 million workers.

[10]This assumes one direct, indirect, and induced job per $43,364 in unallocated prime contracts at the local level, which is the average contract dollars per job computed in this report.

[11]Estimates at private sector job losses by occupation grouping are shown in *Adjusting to the Drawdown* Report of the Defense Conversion Commission, p.61.

TABLE A-12

Aggregate Impact of DoD Activity on Employment and Earnings

Activity	Jobs	Earnings ($ billions)
Active military and induced	2,195,911	$45.6
Other DoD direct and induced[a]	1,277,579	47.4
Local installation purchases	224,071	4.6
Other prime contracts[b]	2,530,107	66.3
Total	6,227,668	$163.9

[a] Excludes 219,000 direct civilian employees not allocated locally and other DoD civilians not subject to OMB ceiling controls.

[b] Excludes $20.4 billion in prime DoD contracts shown in the *Consolidated Federal Funds Report* as the U.S. total.

Appendix B – Metropolitan and Nonmetropolitan Areas With Over 20 Percent Defense-Related Employment

TABLE B-1

Metropolitan Areas with 20 Percent or More DoD Jobs of Total Area Jobs

State	MSA/Metro County
AK	Anchorage, AK MSA (Anchorage Borough)
AL	Anniston, AL MSA (Calhoun County)
AL	Dothan MSA
AL	Huntsville, AL MSA (Madison County)
AZ	Yuma, AZ MSA (Yuma County)
CA	Salinas-Seaside-Monterey, CA MSA (Monterey County)
CO	Colorado Springs, CO MSA (El Paso County)
CT	New London County
FL	Fort Walton Beach, FL MSA (Okaloosa County)
FL	Panama City, FL MSA (Bay County)
FL	Pensacola MSA
GA	Columbia MSA
GA	Macon-Warner Robins MSA
HI	Honolulu, HI MSA (Honolulu County)
MS	Biloxi-Gulfport MSA
MS	Pascagoula, MS MSA (Jackson County)
MT	Great Falls, MT MSA (Cascade County)
NC	Fayetteville, NC MSA (Cumberland County)
NC	Jacksonville, NC MSA (Onslow County)
ND	Grand Forks, ND MSA (Grand Forks County)
OH	Lima MSA
OK	Lawton, OK MSA (Comanche County)
RI	Newport County
SC	Charleston MSA
SD	Rapid City, SD MSA (Pennington County)
TN	Clarksville-Hopkinsville MSA
TX	Abilene, TX MSA (Taylor County)
TX	Killeen-Temple MSA
TX	Wichita Falls, TX MSA (Wichita County)
VA	Norfolk-Virginia Beach-Newport MSA
WA	Bremerton, WA MSA (Kitsap County)

TABLE B-2

Nonmetropolitan Areas with 20 Percent or More DoD Jobs of Total Area Jobs

State	County/County Equivalent
AK	Aleutians West Census Area
AK	Bristol Bay Borough
AK	Fairbanks North Star Borough
AK	Southeast Fairbanks Census Area
AK	Yukon-Koyukuk Census Area
AL	Coffee County
AZ	Cochise County
GA	Bryan County
GA	Camden County
GA	Liberty County
ID	Elmore County
IN	Martin County
IN	Miami County
KS	Geary County
KY	Hardin County
LA	Vernon Parish
MD	St. Mary's County
ME	Sagadahoc County
MI	Iosco County
MO	Johnson County
MO	Pulaski County
MS	Warren County
NC	Craven County
ND	Benson County
ND	Ward County
NM	Curry County
NM	Otero County
NV	Churchill County
NV	Mineral County
NY	Jefferson County
OK	Jackson County
SC	Beaufort County
SC	Marion County
SC	Sumter County
SD	Meade County
TN	Coffee County
TX	Kleberg County
TX	Val Verde County
UT	Tooele County
VA	King George County
WA	Island County

REPORT DOCUMENTATION PAGE

Form Approved
OPM No. 0704-0188

1. AGENCY USE ONLY *(Leave Blank)*	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	February 1993	Final

4. TITLE AND SUBTITLE
A Method for Estimating Local Impacts of Cuts in Defense Spending

5. FUNDING NUMBERS
C MDA903-90-C-0006
PE 0902198D

6. AUTHOR(S)
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8. PERFORMING ORGANIZATION REPORT NUMBER
LMI-DC201R6

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
Department of Defense
Defense Conversion Commission
Suite 310
1825 K Street N.W.
Washington, D.C. 20006

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT
A: Approved for public release; distribution unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT ***(Maximum 200 words)***

By 1997, total DoD outlays are projected to decline by more than 30 percent in real terms from their 1987 levels. The DoD procurement outlays during the same period are expected to decrease by nearly 46 percent. It has been estimated that as many as 1 million private sector jobs in addition to approximately 800,000 DoD jobs may be affected by these planned reductions. The impact of DoD reductions and the accompanying indirect and induced employment reductions has caused serious concern in localities that could be adversely affected.

The Logistics Management Institute (LMI) has applied a methodology to estimate the job losses associated with defense reductions and has applied that methodology to U.S. metropolitan areas and nonmetropolitan counties. LMI's analysis shows that although the vast majority of communities with DoD-related activity are not significantly dependent on that activity, 72 metropolitan and nonmetropolitan areas have been identified where there is a high dependency on defense spending. Further, the methodology could be refined and serve as the basis for a tiered monitoring strategy that could be applied to vulnerable localities.

14. SUBJECT TERMS	15. NUMBER OF PAGES
Defense Conversion, Economic Impacts, Local Economic Impacts, Defense Downsizing, Defense Jobs, Base Closure, Procurement Cuts	39
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UL